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Letter
Circular
LC 106.

DEPARTMENT OF COMMERCE
BUREAU OF STANDARDS
Washington, D.C.

(November 14, 1923).

NOTES ON UPHOLSTERY LEATHER SPECIFICATIONS II.

INTRODUCTION

This letter is a supplement to Letter Circular 97 which contained general notes on upholstery leather specifications together with physical test results on a number of vegetable tanned samples. Physical tests have been made on chrome tanned grain and split samples since LC 97 was issued. The results of these tests to-gether with the results of chemical analyses on vegetable and chrome samples are presented in this supplement.

PHYSICAL TEST DATA

The physical tests on the chrome tanned samples were conducted in the same manner as for the vegetable tanned. The block numbers in the following tables indicate the locations on the hide as shown by sheet L7 in LC 97.

Table 1.
Chrome Tanned Grain Leather (Code Letter K)
Lengthwise Direction.

Block No.	1	2	3	4	5	6
1	41	2040	31	110	20	8.8
3	57	2985	32	160	27	9.4
5	53	2575	47	150	33	12.8
7	47	3045	33	155	27	18.1
12	69	3615	49	186	40	9.9
14	53	2770	48	185	40	7.1
16	100	4347	51	255	40	14.4
21	64	2795	54	200	43	8.9
23	55	2895	43	130	40	10.1
25	89	3845	49	242	50	16.1
32	51	2895	46	315	47	13.3
34	75	3530	46	175	50	3.6
36	67	2895	34	220	37	19.2
41	36	1795	51	350	47	
43	93	4240	36	255	43	16.4
45	33	1605	34	350	50	15.4
52	93	4880	37	240	40	22.8
54	86	3860	41	380	37	17.0
61	45	3195	58	160	37	19.0
27						

Table 2.
Chrome Tanned Grain Leather (Code Letter K)
Crosswise Direction.

Block No.	1	2	3	4	5	6
2	41	2190	51	140	40	6.0
4	27	1465	44	90	37	6.8
6	33	1800	52	170	43	7.7
11	69	3315	36	318	33	11.5
13	37	1900	54	146	50	10.6
15	65	3155	35	328	33	17.1
22	42	3052	48	250	47	11.1
24	34	1800	46	160	43	11.7
26	92	4190	50	280	43	15.3
31	53	2510	44	154	47	10.0
33	38	1885	59	175	50	13.0
35	95	4490	43	475	40	24.2
42	43	2405	49	185	42	7.3
44	125	5400	54	285	53	16.5
51	71	3430	49	266	47	12.0
53	78	3410	66	310	67	30.9
55	81	3815	38	280	27	28.9
62	54	2815	31	170	30	28.8
17				194	47	24.8
46				160	43	16.1

Table 3.
Chrome Tanned Split Leather (Code Letter L)
Lengthwise Direction.

Block No.	1	2	3	4	5	6
1	30	1615	27	140	33	10.0
3	71	3550	34	200	30	9.0
5	92	4790	42	360	33	16.0
12	56	2650	43	180	37	10.7
14	41	2260	33	330	47	23.7
16	146	7860	50	435	50	37.0
21	27	1465	52	105	47	11.7
23	47	1625	43	215	40	20.0
25	75	4300	38	200	33	23.0
27	76	4590	33	580	50	29.7
32	18	1040	36	120	33	21.7
34	39	2270	45	200	37	7.4
36	32	1985	29	500	50	12.7
41	45	2510	40			27.0
43	78	4130	43	290	40	31.7
45	57	3600	50	410	67	39.7
52	128	6960	62	510	70	44.7
54	60	3690	47	322	33	21.0
7				585	57	7.7

Table 4.
Chrome Tanned Split Leather (Code Letter L)
Crosswise Direction.

Block No.	1	2	3	4	5	6
2	40	2065	29	185	30	11.3
4	48	2705	26	190	23	26.0
6	100	5055	53	535	67	36.0
11	50	2570	32	200	30	10.3
13	65	3000	43	280	40	24.7
15	79	4415	35	355	33	18.3
22	30	1630	29	165	30	12.3
24	27	1650	33	190	30	15.3
26	64	3770	52	375	50	55.0
31	66	3430	37	300	47	22.0
33	33	1765	48	218	47	14.7
35	76	4480	44	465	53	52.7
42	93	4775	61	450	77	39.0
44	81	5200	66	300	53	37.3
51	125	7360	69	375	57	21.7
53	51	3260	56	300	63	25.0
17				500	83	64.3
46						10.3
55						11.3

Table 5.
Comparative Results for Chrome and Vegetable Tanned Leathers
Average values for all blocks in both directions.

Tannage	Hides Tested	1	2	3	4	5	6	7
Grain Leather								
Vegetable	5	49	2370	38.7	187	41	7.7	.041
Chrome	1	62	2985	45.5	220	41	15.8	.041
Split Leather								
Vegetable	2	54	2470	37.1	260	39.5	19.6	.043
Chrome	1	63	3495	43.0	317	45.7	28.3	.036

Column No.
1. Breaking Strength in Pounds-Specimen 1/2 inch wide.
2. Tensile Strength in Pounds per square inch of cross-section.
3. Percentage Elongation at Breaking Point-Gauge Length 2 inches.
4. Tensile Strength in Pounds-Grab Test.
5. Percentage Elongation at Failure-Grab Test.
6. Tearing Strength in Pounds.
7. Average Thickness in Inches.

CHEMICAL TEST DATA

Table 6.
Chemical Analyses (As received basis)
Results in Per cent.

Hide	Grain					Machine Buffed			Split		
	A	B	C	H	K	D	F	J	E	G	L
Moisture	6.62	6.51	7.64	6.79	9.87	7.81	7.10	7.66	8.31	8.73	8.92
Grease, (P.E.E)	16.81	15.37	16.09	11.44	11.82	12.20	13.76	8.84	9.96	5.59	9.23
Acidity	0.0	0.0	.15	.13	---	.25	0.0	.11	.50	0.0	---
Total Ash	2.54	2.48	1.14	1.25	4.43	.95	2.46	1.15	.93	2.10	3.92
Cr_2O_3					3.51						3.28

SUMMARY.

From Table 5 it will be noted that the chrome tanned leather has greater tensile strength than vegetable tanned leather and also more resistance to the tearing action of the grab and tear tests. This was to be expected from previous knowledge regarding the comparative properties of leathers tanned by these two processes as was also the fact that the chrome tanned leather had a greater percentage of stretch.

The chemical analyses show that the leather is either neutral or very low in acidity. Although it does not appear in the manufacture of these leathers that it is necessary to use any acid, one sample had .5% which is certainly the maximum that should be allowed in any specification.

It is essential that these leathers be stuffed with greases to give long life but the grease contents of the samples tested gave some results of larger magnitude than was expected. The average value for the grain leather was approximately 15%, for machine buffed leather approximately 11% and split leather approximately 8%. It is possible that some grease may have been extracted from the coatings although an analysis of a sample of grain leather ready for the coating showed 12% and 6% for machine buffed leather.

The ash content for the vegetable leathers varied from .93% to 2.48%. For two uncoated samples the result was .77% showing that the high ash is probably due to materials in the coatings. The analysis of one ash sample showed that the leather contained slightly in excess of 1% of lime. If this amount was present in the uncoated leather it would have the effect of making it harsh but it is at present a matter of speculation as to whether it would effect the durability of the leather.